namely, that as British yachts have to cross the Atlantic in order to take part in the cup races, they can never be built with that extreme lightness of hull which is possible in vessels constructed on the American coast. This undoubtedly counts for much.

Mr. Stephens is an advocate of yachting as a sport, not in the sense of the races for the America or Seawanhaka Cups. He believes in the Corinthian style of yachting—owners working their own vessels. It is obvious that if he could have his way mere racing machines would disappear. Some incidents which he describes as to the performances of American yachts, and the special risks run in consequence of the production of racing machines, are very striking. Only one can be mentioned, that of the *Mohawk*, a centre-board schooner 140 feet long and more than 30 feet broad, with a depth of hold of less than 9½ feet. This vessel drew only 6 feet when her centre-board was housed. Her sail area was enormous, and she had great initial stability; but in 1876, when at anchor off Staten Island, with all sails set and sheets made fast, she was capsized and sank, carrying with her half a dozen persons. On this side we have had equally extreme dimensions, but under our sailing rules, fortunately, there has not been the same inducement to accept serious risks; our vessels have not been lacking in stability in the sense that they were liable to be capsized.

The book may be heartily commended to all interested in yachting, either as a sport deserving continuance or as a branch of ship design.

W. H. WHITE.

A COMPREHENSIVE WORK ON PHYSICS.

Lehrbuch der Physik. By O. D. Chwolson. Translated into German by H. Pflaum. Second volume. Pp. xxii+1056. (Brunswick: Vieweg und Sohn, 1904.) Price 18 marks.

A SERIOUS problem is presenting itself to lecturers and writers of text-books on physics. Never, perhaps, has there been such rapid accumulation of knowledge, both in respect to phenomena the fundamental facts of which were found out in the early ages of physical discovery and in respect to new phenomena which reveal themselves in succession to the physical investigator. The brilliant experimental discoveries of Faraday in electrodynamics, the equally distinguished theoretical and experimental researches of Fresnel in optics, the researches of Mayer, Helmholtz, Lord Kelvin, Clausius, and Joule in thermodynamics, which are unsurpassed in importance owing to their wide reaching application to almost every branch of physics, all these make the first half of the nineteenth century unique as an age of physical discovery. This period was followed by one of comparative quiet, in which physicists began to acquire a comfortable feeling that the universe was now known; details undoubtedly there were to be made out, but no striking discovery was expected. This attitude of content was roughly disturbed by the discovery of Röntgen rays in 1895, and still more startlingly so by the discovery of various other types of rays and emanations by Becquerel and his followers. Each of these discoveries has given birth in a most prolific way to a vast crowd of minor discoveries demanding a history of their own; and meanwhile the accumulation of fact and theory in older subjects has steadily gone on, and the problem which presents itself is, How is this huge and ever increasing amount of knowledge to be successfully presented to a student? It is becoming unmanageable. No single course of lectures can deal adequately with it. College courses are beginning to spread over two years, and even then merely skim the subject. The text-book under review illustrates the state of things. It is the second volume out of four. It extends to more than a thousand pages, and deals only with sound and with radiant energy. It contains no elaborate development of mathematical theory—in fact, the weak point of the book is that there is not enough mathematics in it. Wherever the mathematics required is other than of simple kind it is omitted; the final formula may be given, but it is often quoted unproven. How is a student to master the vast mass of material which is extended to him here? It seems inevitable that before long some process of selection must be adopted in order that a student's work may be made more easy for him. Of course, if a book is intended as a book of reference chiefly, the more encyclopædic it is the better; but the present volume is intended as a text-book, and not as an encyclopædia. We think that the ideal text-book is one which will present such a selection from ascertained knowledge as will give a student an adequate grasp of the facts, principles, and methods of his subject. The selection need not and should not be skimped, but no attempt should be made to include *all* that is known to be true.

Regarded as a book of reference, this volume is most admirable, and we commend the enterprise which now brings it into a wider circle of readers. German is not popular amongst English students, but Russian is barred altogether. The matter is excellent and is excellently presented. It is thorough, and is brought well up to date in this edition; *e.g.* there is a good account of Siedentopf and Szigmondy's recent work on the vision of (so-called) ultramicroscopic particles. The chapter on interference is specially good. The illustrations throughout are unusually clear, especially those explanatory of the various instruments of observation.

The man who gets this book has only himself to blame if he learns no physics. Our only quarrel is with the size of the dose. Experience has shown us that a student fights shy of this heroic treatment, and turns for help to the text-books of the cramming institutions. Less formidable treatment might induce him to put the latter away with advantage.

OUR BOOKSHELF.

Wilhelm Ostwald. By P. Walden. Pp. vii+120. (Leipzig: Wilhelm Engelmann, 1904.) Price 4*s.* net.

PROF. OSTWALD has only just attained his fiftieth year, and in appearance he is full of life and vigour. He has done and is doing a great work in science; he is a man one may delight to honour, both for his intellect and for his heart. It may be merely the prejudice of the reticent Englishman, but I must confess to a feeling that these biographies of eminent men in the prime of

life must be very uncomfortable to their subjects, and a doubtful kindness. If they are to become common, mediocrity will find a new consolation.

It is impossible, however, not to admire and, knowing Ostwald, not to share the warmth of feeling which has prompted the publication of this book. It is written on the occasion of the twenty-fifth anniversary of Ostwald's graduation, and in the 120 pages Prof. Walden gives a very readable account of his subject from the age when the hero was "unser Wilhelm" up to the present time. From it we learn that the life of Ostwald has been free from any very dramatic incidents, and that, like so many eminent men, he was an ordinary boy and a not strikingly exceptional student. When once inspired by the teaching of Lemberg, he really breasted the sea of science and struck out on the course which he has followed with such success. His early career as a teacher was fraught with scanty means and imperfect appliances, but resolution, single-minded devotion and splendid ability overcame all obstacles, and have been rewarded, as we know, with every kind of success to which a true man of science may properly aspire. The book will be read with interest not only by Ostwald's friends and pupils, but by all who are interested in the foundation of the modern school of physical chemists. A. S.

The Lepidoptera of the British Islands. A Descriptive Account of the Families, Genera, and Species Indigenous to Great Britain and Ireland, their Preparatory States, Habits, and Localities. By Charles E. Barrett, F.E.S. Vol. ix., Heterocera, Geometrina—Pyralidina. Pp. 454. (London: Lovell Reeve and Co., Ltd., 1904.) Price 12*s.* net.

THE ninth volume of Mr. Barrett's great work marks substantial progress, and practically completes the Macrolepidoptera. About 180 species are described. The Geometrina include the families Larentidæ (the conclusion here given chiefly consisting of the great genus Eupithecia, of which forty-eight British species are admitted, one doubtful, but also including Eubolia and its allies, formerly placed in a distinct family), and Œnochromidæ, with only two British genera, Tanagra and Aplasta. The Pyralidina include the families Pyraustidæ, Pyralidæ, Hydrocampidæ, Endotrichidæ, Scopariidæ, Pterophoridæ, Orneodidæ, and Phycitidæ. The last family is not quite completed in vol. ix., so there now remain but the Galleriidæ, Crambidæ, Tortricina, and Tineina to be dealt with. As it is possible that these may not require to be treated in such great detail as the Macrolepidoptera, perhaps four or five more volumes may be sufficient to complete the book, which will remain as a permanent record of the work accomplished by British lepidopterists during the latter half of the last century and the opening years of the present. Among the more interesting features of vol. ix. may be noted the carefully-drawn-up table of the large and difficult genus Eupithecia, which ought much to facilitate the determination of species; and the exact records of the occurrence of the rarer species of Pyralidæ, many of which are met with, at least in Britain, only singly and sporadically at long intervals and in widely separated localities. Many interesting species, some of wide distribution abroad, have thus been added to our British lists of late years.

It will be seen that to a considerable extent Mr. Barrett still follows an arrangement similar to that of Stainton's "Manual"; it is, however, a great improvement to associate the Pterophoridæ with the Pyralidæ, as is now generally done. The Orneodidæ are a more aberrant family, and we are not sure that their real affinities have yet been finally determined.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Flowering of the Bamboo.

I HAVE read Mr. Tingle's letter in NATURE for August 11, as well as Prof. Farmer's comments on it, and hope you will permit me to add my remarks to the discussion of the subject.

Mr. Tingle ought to have specified which of the Chinese bamboos it is that has now flowered. According to the list given by Dr. Rendle in the recently published part of the *Journal* of the Linnean Society, vol. xxxvi., there are about forty-two species of bamboo, large and small, in China, and it would be interesting to know which of them it is. Let us hope that Mr. Tingle is sending good specimens to the Kew and British Museum herbaria. Until the species referred to has been ascertained, discussion is rather difficult, except from a general point of view.

My own experience of bamboos is confined to India, where there are more than 120 species, large and small, but I have never heard that their flowering, even when it takes place gregariously, has caused alarm among the natives. The gregarious flowering of the common species such as *Dendrocalamus strictus* or *Bambusa arundinacea* often takes place in an exceptionally dry season, when there may also be partial failure of the crops, and on such occasions advantage is sometimes taken of the general seeding to collect and use the seeds for food. Signs of approaching flowering may, perhaps, occasionally be received with misgiving as foreshadowing a dry season and bad crops, but I have never heard of their being regarded with anything approaching to superstitious terror.

So far as we know at present, some of the Indian-Burmese species only flower gregariously at long intervals, but even then there is some doubt whether the flowering is local only or widespread. The well known Kyathaungwa (*Bambusa polymorpha*), a large species with culms up to 80 feet in height and 6 inches in diameter, and notable as a common associate of the teak tree, was collected in flower by Dr. M'Clelland in Pegu in 1854, by Sir D. Brandis in the Salween in 1862, and by Mr. S. Kurz in the Sittang Valley in 1871, and flowers have once been reported since from Bassein; but in more recent years it has not flowered, though its gregarious flowering is being anxiously awaited by forest officers, who hope to use the opportunity for the extension of teak reproduction. There are some species of bamboo which flower regularly every year and do not die off: among them are the little *Arundinaria Wightiana*, so common in the forests around Ootacamund in the Nilgiri Hills; *Bambusa lineata*, a small reedy species of the coast forests of the Malay Archipelago, extending westwards only to Rutland Island in the Andamans, though strangely enough it has not, so far as I am aware, been known to produce seed; and *Ochlandra stridula*, a shrubby species of the low country of Ceylon. The great majority of species, however, have their chief flowerings gregarious, at more or less regular intervals, while every now and again a few clumps may be found in flower sporadically in almost any year. This is especially the case with *Dendrocalamus strictus*, the "male bamboo" so widespread in the deciduous more or less dry forests of India and Burma; with the thorny *Bambusa arundinacea* of the Western Peninsula; with *Dendrocalamus Hamiltonii*, the most common species of northern Bengal and Assam; and with *Bambusa Tulda* in Bengal, the east coast hills, and Burma. Gregarious flowerings may really be often quite local, though widespread enough within their locality.

When, in India, bamboos flower gregariously, they usually produce quantities of good seed, and the old clumps then die off; but in sporadic flowerings my experience is that seed is very little produced, or if produced infertile, while the clumps occasionally may recover, though rarely. Damage to a clump may often produce a partial or sporadic flowering. Information on the subject is being gradually collected in India; the dates of flowering of the different species are, when observed by forest officers,